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Body Mass Index: Effects on Overt Behaviors and Perceived Reward

Christin Nicole Mullane
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To the Graduate Council:

I am submitting herewith a thesis written by Christin Nicole Mullane entitled "Body Mass Index: Effects on Overt Behaviors and Perceived Reward." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Arts, with a major in Psychology.

Derek Hopko,, Major Professor

We have read this thesis and recommend its acceptance:

Paula Fite, Hollie Raynor

Accepted for the Council:
Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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Body Mass Index: Effects on Overt Behaviors and Perceived Reward

A thesis presented for

the Master of Arts degree

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Christen Nicole Mullane

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Abstract

The incidence of obesity, defined as a BMI [body mass index] of over 30, has increased by 50% in the past 20 years (Carlson, 2004). Some notable behavioral differences as a function of weight have been identified, including the findings that individuals with obesity participate less often in physical activities, and spend more time engaging in sedentary behaviors. Using a daily-dairy assessment method as completed by undergraduate college students (*n*=99), the current study examined the impact of BMI on the duration of time spent and pleasure experienced within 13 behavioral domains: 1) Social, 2) Physical, 3) Health/Hygiene, 4) Spiritual, 5) Educational, 6) Sedentary, 7) Sexual, 8) Employment or Volunteering, 9) Hobbies and Recreation, 10) Eating Alone 11) Eating with Others, 12) Travel, and 13) Other. Controlling for depression, anxiety, and locus of control, both univariate and multivariate statistics suggested non-significant relationships between BMI and duration and reward level of behaviors. Study limitations and future directions are discussed.

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INTRODUCTION AND LITERATURE REVIEW

Despite social stigma associated with being overweight and the serious impact of obesity on mental and physical health, the incidence of obesity, defined as a BMI [Body Mass Index] of over 30, has increased by 50% in the past 20 years (Carlson, 2004). According to the National Health and Nutrition Examination Survey (NHANES; Hedley et al., 2004), among American adults aged 20 years and over (assessed from 1999-2002), 65.1% were designated as overweight or obese. Of these individuals, approximately 30% were considered obese and 5% were considered extremely obese (overweight BMI: 25.0-29.9, obesity BMI: $\geq$ 30.0, and extreme obesity BMI: $\geq$ 40.0). According to the same survey, among children aged 6 through 19 years, 31.0% were categorized as either overweight or obese.

Research consistently has shown that overweight and obese persons are vulnerable to increased health problems. For example, obesity is significantly associated with diabetes, high blood pressure, high cholesterol, asthma, arthritis, and poor health status (Mokdad et al., 2003). Obese individuals also are more likely to suffer from gout, gallbladder disease, certain cancers, and post-surgery complications (Straub, 2002; U.S. Department of Health and Human Services, 2000). Indeed, a BMI above 40 has been found to be associated with a two-fold increase in mortality rate (Straub, 2002).

In addition to affecting health, weight plays a substantial role in psychological and social functioning. The social consequences of obesity are readily apparent to overweight children and adults, who are often teased and/or perceived as unkempt, unattractive, or lacking willpower (Friedman & Brownell, 1995; Harris, Walters, & Waschull, 1991). Indeed, some research suggests that weight discrimination is even greater than race and gender discrimination, and that

it affects every aspect of employment including hiring, promotion, and salary (Dejong, 1980; Roehling & Winters, 2000). Weight has been shown to influence mental health in a variety of ways. For example, overweight women are at an increased risk for experiencing both depression and suicidal ideation (Straub, 2002). In addition, both males and females who experience binge eating episodes or are identified as having binge eating disorder are more likely to be diagnosed with concurrent depression, anxiety, and body image dissatisfaction (Matos et al., 2002). Thus, it appears that increases in weight not only increase the likelihood that an individual might suffer negative health consequences, but also serve to decrease an individual's ability to experience his or her environment as pleasant or rewarding.

Measurement of Obesity

Studies of overweight and obese populations frequently use the BMI, or body-mass index, as a means of distinguishing between healthy and non-healthy weight levels (Andersen et al., 1998; Brown & Trost, 2003, Brown, Miller, & Miller, 2003; Huang et al., 2003; Parsons, Power, & Manor, 2005; Straub, 2002; Vandewater, Shim, & Caplovitz 2004; Wake, Hesketh, & Waters, 2003). To assess body composition and designate individuals as overweight or obese, recent studies also have included measures of skin fold thickness (Davis, Durnin, & Elliott, 1995; Reibe et al., 2005; Stevens et al., 2004), central-to-total adiposity ratios (Garnett et al., 2005), waist-to-hip ratios and waist measurements (Chen et al., 2005), bioelectrical impedance analysis (or BIA; Stevens et al., 2004; Straub, 2002), hydrostatic weighing (Straub, 2002), dual energy x-ray absorptiometry (DXA; Steinberger, Jacobs, Raatz, Moran, et al., 2005) and isotopic dilution (Rennie et al., 2005). Nevertheless, BMI scores remain one of the most commonly used measurements in obesity studies. As discussed above, BMI scores correlate strongly with an

individual's risk for various diseases, and are considered a reliable measurement method for assessing obesity. Although BMI does not directly measure body fat, research has shown that body mass index scores correlate strongly with direct measures of body fat, such as underwater weighing and dual energy x-ray absorptiometry (Garrow & Webster, 1985; Mei, Grummer-Strawn, Pietrobelli, Goulding, et al., 2002). Thus, BMI is considered a valid alternative for measuring body fat. Additionally, common use of BMI scores in research is at least in part due to the relative ease and cost-effectiveness of assessing height and weight, without the need for extensive training and expensive equipment characteristic of several aforementioned strategies.

Common Factors that Influence BMI

Demographic Factors

In an attempt to slow the growing epidemic of obesity within the United States, much modern research focuses on factors that predict or influence the development of obesity, including demographic, socioeconomic, and cultural variables. For example, some studies show that children whose families have recently immigrated to the United States and are of lower socioeconomic status (i.e. decreased financial income) are more likely to be obese (Fiscella, 1999; Magnusson et al., 2005). Research also shows that the proportion of adolescents from poor households who are overweight or obese is twice that of adolescents from middle- and high-income households (U.S. Department of Health and Human Services, 2000). Other investigations have found no significant differences as a function of socioeconomic status (Kouvonen et al., 2005; Reibe et al., 2005). Lower levels of education, involvement in a marital relationship, entering the workforce, living in an urban setting, having children, and limited functional status also are risk factors for becoming overweight (Brown & Trost, 2003; Kaplan et al., 2003).

In addition to these factors, individuals of certain ethnic backgrounds may be more vulnerable to being overweight or obese. Economically disadvantaged and ethnic minority populations have considerable challenges to overcome to achieve and maintain healthy weight and levels of physical activity, as well as to initiate and support healthy dietary habits (Taylor, Poston, Jones, & Kraft, 2006). For example, low-income neighborhoods populated predominantly by African-Americans were found to have more fast-food restaurants per square mile than neighborhoods populated primarily by Caucasians (Block, Scribner, & DeSalvo, 2004). Obesity appears to be more common among African American and Mexican American women than among white women (U.S. Department of Health and Human Services, 2000). In the current study, demographic data were collected to control for potential impact of gender and ethnicity on an individual's weight.

Personality Factors

From a psychological standpoint, correlates of obesity have not been consistently reported (Friedman & Brownell, 1995). Few studies have been able to identify a distinct personality style exhibited by obese individuals (Wadden & Stunkard, 1985). Studies have assessed personality style using a variety of instruments, including the MMPI (Grana, Coolidge, & Merwin, 1989; Webb, Morey, Castelnuovo-Tedesco, & Scott, 1990), the Millon Clinical Multiaxial Inventory-II (Macias & Vaz Leal, 2002), and the Rorschach, Exner's Comprehensive System (Elfhag, Rossner, Lindgren, Andersson, et al., 2004), among others. In a recent study, the NEO Five-Factor Inventory (NEO-FFI) was used to capture the five dimensions of personality (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) as these related to weight status in women (Provencher, Bégin, Gagnon-

Girouard, Tremblay, et al., 2008). Findings suggest that higher levels of neuroticism and conscientiousness predict higher scores for cognitive dietary restraint, and higher levels of agreeableness predicted a lower score of susceptibility to hunger. Other studies have shown that elevated neuroticism and reduced extraversion are related to higher weight status among women (Faith, Flint, Fairburn, Goodwin, & Allison, 2001). A higher score of novelty seeking has also been linked to lower successful weight management and could indicate a stronger drive toward overeating in obese individuals (Sullivan, Cloninger, Przybeck, & Klein, 2007). Overall, however, an examination of personality factors as these relate to the presence of obesity demonstrates a vast heterogeneity of personality traits within obese populations.

Emotional Factors

Many of these demographic factors have been found to interact with emotional disturbances and stress to predict obesity and maladaptive eating behaviors. For example, depression has been shown to influence body weight, though there appears to be a bi-directional relationship between these variables. In other words, some individuals gain weight when depressed whereas others appear to lose weight. Some studies show that depressed individuals are not only more likely to be overweight than healthy controls, but when treated with antidepressant medication, those who are overweight or obese may exhibit poorer treatment response and less improvement in neurological functioning than patients with a normal BMI (Kloiber et al, 2007). Further research indicates that adult obesity may be related to childhood depression (e.g. Janssen et al., 2005), although this effect seems to be moderated by gender. For example, women who develop depressive symptoms prior to turning 17 years of age are more likely to gain weight over the next decade (4.8% vs. 2.6% BMI increase for non-depressed

women), increasing risk for adulthood obesity (Hasler et al., 2005). For men, depressive symptoms manifesting prior to age 17 are associated with increased weight gain in adulthood (6.6% vs. 5.2% BMI increase for non-depressed men), but not necessarily an increased incidence of obesity.

Binge eating, which can result in weight gain and obesity, is predicted by psychological and emotional factors such as weight- and shape-related teasing, body dissatisfaction, and negative affect (Womble et al., 2001). In addition, stress or anxiety driven eating has been found to adversely affect BMI in adults. Such eating typically consists of foods with low nutritional value. Among women, this type of eating is most often caused by a perceived lack of emotional support. In contrast, stress-driven eating in men is best predicted by being single or divorced, a long history of unemployment, and having an academic degree (Laitinen, Elk, & Sovio, 2002). Dietary habits have been shown to cause weight gain in females, with foods eaten away from home (e.g. fast foods) being a significant predictor of increased BMI (Thompson et al., 2004). More generally, it has been demonstrated that positive attitudes toward unhealthy food consumption greatly increase risk for obesity (Craeynest et al., 2005). Interestingly, basic research in both animals and humans has shown that when participants are exposed to a depressive mood induction, the reinforcing value of food shifts from a preference for healthier foods to those that are sweeter and less nutritious (Willner et al., 1998). Emotional eating, which shows a high degree of overlap with binge eating, refers to eating in response to negative emotions (Bruch, 1973). It is often viewed as coping behavior that enables individuals to manage depressive or negative emotions by serving as a distraction from negative affect (e.g., Elmore & De Castro, 1990). It can be seen as a form of avoidant coping, specifically through evading

negative emotional states and escaping the expression of negative emotions (e.g., Bekker & Spoor, 2008; Neckowitz & Morrison, 1991; Soukup, Beiler, & Terrell, 1990; Troop, Holbrey, Trowler, & Treasure, 1994; Wardle, Steptoe, Olliver, & Lipsey, 1999). The emotional avoidance literature suggests that individuals with Binge Eating Disorder experience heightened levels of negative emotional arousal and more negative responses to emotions, and support the hypothesis that emotional avoidance is responsible at least in part for the maintenance of binge-eating in obese individuals (Pells, 2006). In order to control for effects of negative affect on eating behavior, depression and anxiety measures were administered to participants in the current study.

Activity Type and Duration

Research in nutrition consistently shows that in order for weight gain to occur, an individual must enter a positive energy balance. In other words, the amount of energy or calories consumed by an individual must be greater than the amount of energy expended by that individual. Throughout the day, individuals engage in a wide range of activities that result in variations in energy expenditure. Individuals who are more active expend more energy and those who are less active expend less energy and are at increased risk for entering a positive energy balance.

Activities assessed in obese versus normal research samples most commonly include quantity of time spent viewing television (Andersen et al., 1998; Wake, Hesketh & Waters, 2003; Kautiainen et al., 2005; Viner & Cole, 2005), playing electronic games or using computers (Magnusson et al., 2005; Reibe et al., 2005; Vandewater, Shim, & Caplovitz 2004), and physical activity (Katzmarzyk, Malina, Song, & Bouchard, 1998; Parsons, Power, & Manor, 2005). Physical activity is often measured using accelerometers (Stevens et al., 2004; Treuth, Hou,

Young, & Maynard, 2005), although self-report methods (Huang et al., 2003), direct observation (Trost et al., 2003), and teacher/parent reports have also been employed (Reibe et al., 2005; Wake, Hesketh, & Waters, 2003).

Overall, these studies indicate that increased television watching, electronic game playing, and computer use are independently associated with being overweight or obese (Andersen et al., 1998; Reibe et al., 2005; Stevens et al., 2004; Viner & Cole, 2005), whereas greater physical activity correlates with lower BMI scores (Andersen et al., 1998; Davis, Durnin, & Elliott, 1995; Reibe et al., 2005; Stevens et al., 2004; Trost et al., 2003; Vandewater, Shim, & Caplovitz 2004; Wyatt et al., 2005). In a recent study, it was shown that overweight individuals spend less time in moderate to vigorous physical activity and have lower step rates than individuals of normal weight (Yoshioka et al., 2005). Given the number of variables to be controlled in attempts to link lower BMI scores with increased physical activity, however, it is unsurprising that the negative correlation between physical activity and obesity is considered by some to be debatable, with at least two studies showing no relationship (Holtkamp et al., 2004; Stevens et al., 2004). However, research generally shows that increasing physical activity is an effective means of decreasing BMI scores (e.g. Cast et al, 2007; Viner & Cole, 2006).

Some age and gender differences in relation to BMI and television watching and video game playing are evident, with time spent in these activities more associated with higher BMI in female individuals (Kautiainen et al., 2005; Treuth, Hou, Young, & Maynard, 2005; Vandewater, Shim, & Caplovitz 2004). In other words, video game playing is an activity in which males typically engage across all BMI levels, whereas video game playing among females is more indicative of a sedentary lifestyle. Thus, activity type and its effect on BMI could vary as a

function of gender. Additionally, physical activity has been shown to decrease more for females than males throughout adolescence, although overall it appears to decrease for both genders (Suris & Parera, 2005). Adolescent females are more likely to gain weight during this period of development for various reasons, one of which could be decreased participation in physical activity. In adult populations, relative to males employed full-time, females employed full- or part-time in the workplace or full-time in the home are less likely to be overweight or obese (Brown, Miller, & Miller, 2003), and male gender is a risk factor for obesity (Kaplan et al., 2003). Dieting behavior seems to vary as a function of gender. Bish et al. (2005) reported that adult females attempted to lose weight at lower BMI levels than males, and that women were generally more likely to attempt to lose weight than men.

In general, the reviewed studies provide support for the notion that overweight and obese individuals spend less time engaged in physical activity than do individuals of normal weight. These differences in activity type and duration could be due at least in part to differences in perceived reward value for various activities.

Reward and Reinforcement

Food is a primary reinforcer, with no direct learning required for food to motivate behavior. Different foods possess different reinforcement values for individuals, however, with reinforcement value typically measured by the frequency of responses an individual emits according to varying reinforcement schedules in order to obtain that food (Epstein & Saelens, 2000). Such studies have found that the reinforcing value of food as opposed to other activities varies as a function of BMI, with more obese individuals willing to work harder to obtain food than to engage in sedentary activities (Saelens & Epstein, 1996).

Reinforcement value has also been measured within choice paradigms, where research participants are given the choice between eating two different foods, or between eating food and engaging in an alternative activity (Epstein & Leddy, 2006). Choice paradigms are important in that they more accurately replicate real-world decision-making situations than do other forms of food reinforcement research. Within choice paradigms, the decision to engage in eating behavior depends on the reinforcement associated with alternative activities, as well as the constraints or behavioral cost associated with obtaining food (Epstein & Leddy, 2006). When given the choice between eating and engaging in another activity, studies show that participants will usually choose to eat, unless the behavioral cost associated with gaining access to a particular food becomes too high (Goldfield & Epstein, 2002).

The current study examines the reinforcing (or reward) value of several types of activities, including eating behaviors, as a function of BMI. Individuals must choose between a wide variety of activities each day, and behavioral choice theory indicates that individuals will choose to engage more often in more rewarding activities. Using a daily diary procedure, participants in the current study recorded the activities in which they engaged throughout the day, in addition to tracking the amount of pleasure or reward they experienced when engaging in these activities. This method allowed for a direct examination of BMI as it related to the reinforcement value of various activities, including eating behavior.

Current Study

As demonstrated above, demographic and emotional factors, in addition to dieting patterns, differences in activity type or duration, and variation in perceived reward of various activities, could all relate to changes in BMI. As many studies in this area of research are cross-

sectional in design, it is difficult to draw definitive causal conclusions regarding the relationships of these factors with obesity. However, research has shown conclusively that obesity is caused by a positive energy balance, or a shift in caloric intake such that energy consumption exceeds energy expenditure. Differences in activity type and duration can and do influence energy expenditure. Variations in perceived reward influence the likelihood and the length of time that an individual will engage in different types of activities. Further evaluation of the relationship between BMI, behavior, and reward value is warranted.

The majority of research to date has focused on sedentary versus active behaviors as they pertain to weight change. Unfortunately, many of the reviewed studies have made assumptions about qualitative differences insofar as the types of activities in which normal versus overweight subjects typically engage. Consequently, it could prove helpful for researchers to obtain more direct and descriptive assessments of activity type and duration as these factors relate to weight. Additionally, different behaviors could be reinforced differentially across normal, obese, overweight, and underweight participants. With the objective of better understanding the persistence of certain behaviors in overweight versus non-overweight individuals, it is worthwhile to assess perceived reward associated with various behaviors.

The following study was designed to examine relations among daily activities, their duration and frequency, and the amount of pleasure derived from engaging in these behaviors, as these factors relate to BMI. Such an examination could aid in developing more specific and qualitatively sound interventions for obese individuals. Assessing how enjoyable activities are for various weight groups can provide valuable insight into how maladaptive patterns of behavior may be associated with weight gain. Similarly, this analysis could help determine how

documenting the frequency and duration of certain behaviors could be useful toward developing and maintaining healthy lifestyle choices. In accordance with these ideas, activity type, duration, and perceived reward were assessed in the current study, using a self-report daily diary method.

Daily diaries have often been used within the domains of clinical and health psychology as a means of assessment. For instance, daily diaries such as those used in the current study have been used to assess the relations among mood state, overt behavior, and reward value of activities (Hopko et al., 2003). Increasing evidence suggests that the daily diary approach can be considered both reliable and valid. For example, in depression research, self-reported depressive symptoms (as measured by the Beck Depression Inventory; Beck & Steer, 1987) were highly convergent with aversive behavioral experiences reported in daily diaries (e.g. conflictual experiences, feeling trapped; Robbins & Tanck, 1984). Diary methods have also been shown to have strong psychometric properties in research on anxiety (Fydrich, Dowdall, & Chambless, 1992; Nelson & Clum, 2002), pain (Feldman, Downey, & Schaffer-Neitz, 1999; Grant, Long, & Willms, 2002), alcohol abuse (Watson, 1999), sexual behaviors (Okami, 2002), gambling (Atlas & Peterson, 1990), and insomnia (Haythornthwaite, Hegel, & Kerns, 1991).

In order to widen the qualitative scope of activities assessed in relation to weight, the current study assessed activity types across the following behavioral domains: (a) social, (b) physical, (c) health/hygiene, (d) spiritual, (e) educational, (f) sedentary, (g) sexual, (h) employment/occupational, (i) hobbies and recreation, (j) eating, and (k) travel. Sedentary and physical activity behavioral domains were each included based upon the literature cited above. The remaining categories were chosen based upon both clinical observations and naturalistic observation of undergraduate students. As the primary objective of the present investigation was

to explore behavioral patterns as a function of body mass, several potentially confounding variables were controlled. Given the relations between overt behavior and mood states such as depression (Hopko et al., 2003; Lewinsohn 1974) and anxiety (Barlow, 2002), these emotional states were used as covariates in analyses. Similarly, given the literature that highlights complex relationships among locus of control, BMI, emotional states, and overt behavior (Burggraf, 2001; Nussbaum, 2005; Paxton & Sculthorpe, 1999), variance associated with locus of control also was taken into account using the Multidimensional Health Locus of Control (MHLC; Wallston, Wallston, Kaplan, & Maides, 1976). Given this design, primary hypotheses were as follows: (1) After controlling for the potential impact of locus of control and depressive and anxious affect, BMI would account for significant variance in the amount of time engaged in various behaviors (e.g. higher BMI would be associated with increased sedentary and eating behavior as well as decreased physical behavior). (2) BMI would be differentially associated with reward obtained from engagement in behavioral response categories. In particular, individuals with higher BMI would find physical activity or social activity less rewarding relative to individuals of lower BMI. The latter seems especially likely considering the social stigma that is associated with being overweight or obese (Friedman & Brownell, 1995; Harris, Walters, & Waschull, 1991). Caution was taken in formulating hypotheses about other behavioral domains being assessed, as these behavioral domains are comparably less studied in the literature. Thus, no specific hypothesis of the relationship between, for example, BMI and spiritual behavior is offered here, and analysis of such relationships was considered exploratory in nature.

METHOD

Participants

A random sample of college students (n = 99) was recruited from the general population of students at the University of Tennessee, Knoxville**.** Participants were recruited from undergraduate Introduction to Psychology courses, via an online research participation system [Human Participation in Research (HPR)]. In order to participate, individuals were required to attend the University of Tennessee, to be enrolled in an Introduction to Psychology course, and to be 18 years of age or older. Student participants filled the research requirement for their Introduction to Psychology course by participating in the current study.

Participants included 41 females and 58 males. The average age of participants was 19.7 years (SD = 2.2; Range = 18-36) and the average education was 13.6 years (SD = 1.1; Range = 12-18). The sample was fairly homogenous ethnically, with 82.8% of the sample reporting Caucasian ethnicity, 10.1% African American, 4% Asian or Pacific Islander, 1% American Indian or Alaska Native, and the remaining 2% identified as "Other." Approximately half of the sample was unemployed (50.5%), 41.4% was employed part-time, and the remaining 8.1% was employed full-time while attending courses at the University of Tennessee.

For univariate analyses, participants were categorized into four groups using body mass index scores (weight in kilograms divided by height in meters squared), according to CDC guidelines. A BMI below 18.5 classified participants as underweight (n = 3); between 18.5 and 24.9 classified participants as normal weight (n = 59); between 25.0 and 29.9 classified participants as overweight (n = 29); 30.0 and above classified participants as obese (n = 16).

Assessment Measures

Demographic and height/weight questionnaires

Body mass index (BMI) was assessed by measuring height and weight in the laboratory. Weight and height measurements were taken by researchers using one of two calibrated scales. Demographic information was obtained via participant self-report (gender, age, ethnicity, marital/relationship status, and socioeconomic status (see Appendix for a sample Demographic form).

The *Beck Depression Inventory-II* (BDI-II; Beck, Steer, & Brown, 1996) assesses the severity of depressive symptoms and consists of 21 items. The instrument has excellent psychometric properties (Beck et al., 1996; Nezu, Ronan, Meadows, & McClure, 2000). In the current study, internal consistency was very strong at both the pre- (α = .84) and post-diary assessment (α = .86).

The *Beck Anxiety Inventory* (BAI; Beck & Steer, 1990) is a 21-item questionnaire designed specifically to distinguish cognitive and somatic symptoms of anxiety from those of depression. Good psychometric properties have been demonstrated among community, medical, and psychiatric outpatient samples (Morin et al., 1999; Steer, Willman, Kay, & Beck, 1994; Wetherell & Areán, 1997). In the current study, internal consistency was strong at both the pre- (α = .82) and post-diary assessment (α = .87).

The *Multidimensional Health Locus of Control Scale* (MHLC; Wallston, Wallston, Kaplan, & Maides, 1976) was used to measure locus of control. This scale has been used to study a wide variety of health problems in relation to locus of control. The scale is based on Rotter's Internal-External Control Scale, which has been used in studies comparing obese and non-obese

samples (Karpowitz & Zeis, 1975) as well as among individuals with eating disorders (Shisslak, Pazda, & Crago, 1990).

Daily Diaries

Daily Diaries were used to assess the relations among BMI, activity type, and reward value of activities. A one-week diary keeping procedure similar to that used in the Hopko et al. (2003) study tested whether higher BMI scores were differentially associated with engagement in specific activities, as well as whether or not these activities were associated with differential levels of pleasure and with changes in BMI.

Procedure

These data were collected during the Spring 2007 semester at the University of Tennessee, across a period of five months (January to May). Each participant met individually with an experimenter on two occasions. During the first meeting the participant completed informed consent procedures, the BDI-II, BAI, MHLC, and the demographic form. Participants were then given a packet of daily diaries and instructed on how to complete the diaries (See Appendix for a sample diary). Included in this packet was a set of directions and a copy of an activity coding system complete with examples of typical activities that might be included within categories (see instructions below). Participants were asked to record specific activities, code them, and then rate activities for pleasure using a 4 point Likert-scale, ranging from 1 (“minimal pleasure”) to 4 (“extreme pleasure”).

Participants were instructed as follows: “These daily diaries should be completed every day for the next week. The first diary entries should be completed tomorrow. Note that the day of the week is circled in the box at the top of the page. For each half hour, you will record your

main activity or behavior in the space provided. Your activities will be recorded each day beginning at 8 A.M. and continuing until 2 A.M. the following day. If you are sleeping during any of these hours, simply record that as your principal activity for those hours once you awaken. If it is too overwhelming to update your diary each half hour, please try to update it every few hours. Also, remember you are only recording your behaviors. You do not need to include your private thoughts and feelings. For example, you would not record details about how much you like or dislike a particular class or professor. Rather, you would simply record your activity as 'class,' or 'in class.' It is important for you to know that all activities in which you engage will be kept confidential. So, please make every attempt to act as you normally would, and please be specific and honest about your activities.

For each half hour activity listed, please also code your activity with one of the following numbers:

1) Social: time with friends, family, etc.
2) Physical: hiking, biking, walking to class, any other exercise, etc.
3) Health/Hygiene: showering, bathing, etc.
4) Spiritual: attending church, engaging in prayer or meditation, reading a religious text, etc.
5) Educational: classes, homework, lectures, computer work, etc.
6) Sedentary: napping, sitting, watching television, internet surfing for fun, etc.
7) Sexual: intercourse, masturbation, etc.
8) Employment/Volunteering: working at your job, babysitting, helping the elderly, etc.
9) Hobbies and Recreation: reading, drawing, writing, playing a musical instrument, etc.
10) Eating alone: snacking, meals, etc.

11) Eating with others: snacking, meals, etc.

12) Travel: commuting to school, home, work, foreign countries, etc.

13) Other

Please choose only one category code to describe the main activity you list for each half hour. Some activities may seem to fall into more than one category. In these cases, please pick the one category that best fits the activity you record. For example, you may physically be seated in class. However, assuming that you are actively engaged in learning, you would probably code this activity as 'educational' rather than 'sedentary.'

In addition to recording and coding your activities, you should also rate each activity for the amount of *pleasure or reward* you receive from it. For this portion of the task, you will use a scale (illustrated on each diary page) with values ranging from one to four. A score of one indicates that the activity is 'minimally pleasurable' to you, while a score of four would mean the activity is 'highly pleasurable' for you. Of course, scores of two or three would fall between these extremes."

Following this description, participants' questions were answered; they then exited the session to engage in the weekly monitoring exercise, and returned approximately 1 week later (pending participant and experimenter availability) to complete the post-assessment BDI-II, BAI, and MHLC, to return the daily diaries to the experimenter, and to undergo debriefing procedures. The BDI-II, BAI, and MHLC were completed twice so that average scores could be calculated for the week during which the daily diaries were administered, and to control for any change in these scores throughout the week.

RESULTS

Descriptive Data

According to CDC guidelines, the frequency of college students who were overweight or obese (38%) was consistent with national norms (31%). For the entire sample (n = 99), the most commonly reported behaviors were as follows, presented in descending order according to the percentage of time activities were engaged in during the monitoring week: Sedentary (29%), Educational (21%), Social (12%), Physical (7%), Employment (6%), Eating with Others (6%), Travel (5%), Health and Hygiene (4%), Hobbies and Recreation (3%), Other (3%), Eating Alone (2%), Spiritual (1%), and Sexual (1%). Activity duration (hours per week) as a function of BMI group is presented in Table 1 (all tables are located in the Appendix).

Bivariate Analyses

Data were first examined in order to determine the presence of any correlation between BMI, gender, depression, anxiety, and locus of control. This analysis included gender, BMI score, and mean BDI-II, BAI, and MHLC scores. As shown in Table 2, a significant positive correlation between mean BDI-II and mean BAI score was found (Pearson Correlation 0.74; $p < 0.01$). There was an additional significant relationship between BMI score and gender, with males more likely to exhibit higher BMI scores (Pearson Correlation -0.25; $p < 0.05$). These results are not surprising, given the strength of the relationship between depression and anxiety in other studies, and given the general differences in body structure and biology between males and females.

Univariate Analyses

To examine the relationship between BMI and time spent engaging in behavioral domains, data were examined using a series of one-way ANCOVA's, using mean BDI-II, BAI, and MHLC scores as covariates in analyses. The same statistical method was used to examine whether reward perceptions differed as a function of body mass index. As this study was cross-sectional in design, causal inferences regarding changes in activity type and duration, or regarding differences in body mass index, cannot be drawn. Body mass index was considered the independent variable because this design has been used in previous studies (e.g. Saelens & Epstein, 1996), and due to the fact that weight was stable for the duration of the study, while activity type and duration and reward ratings had greater potential to differ from day to day. Estimated eta-squared (η^2; Keppel, 1991) is presented as a measure of effect size (η^2 = .01 = small; η^2 = .06 = medium; η^2 = .16 = large). As illustrated in Table 3, no significant effects were found for the duration of time spent in behavioral domains as a function of BMI. As presented in Table 4, there were also no differences in perceived reward on behavioral domains as a function of BMI.[1]

Multivariate Analyses

To assess the relations among time spent in behavioral domains, BMI, and mental health variables with BMI conceptualized as a continuous variable, simultaneous regression analyses were conducted for each of the 13 behavioral domains and their associated reward values. As reported in Table 5 (model statistics), none of the regression models that examined time duration

[1] Note that similar results were obtained following hierarchical regression analyses in which for all behavioral domains, depression, anxiety, and locus of control were entered in the first block and BMI was entered in the second block. In no case did BMI account for significant unique variance in predicting time spent or reward value of behavioral domains.

as predicted by BMI, depression, anxiety, and locus of control were significant. Within these models, t-values associated with each predictor variable also were non-significant. Similarly, as reported in Table 6 (model statistics), none of the regression models that examined reward value as predicted by BMI, depression, anxiety, and locus of control reached significance. Within these models, t-values associated with each predictor variable also were non-significant. [2]

Gender Analyses

Finally, in order to examine the relationship between gender and time spent engaging in behavioral domains, univariate analyses were completed with gender included as a fixed factor, once again using BDI-II, BAI, and MHLC scores as covariates in analyses. This statistical method was also used to examine whether reward perceptions differed as a function of gender. As illustrated in Tables 3 and 4, few significant differences were found for time spent or in perceived reward as a function of gender. There was a significant difference in time spent engaging in "Other" activities as a function of gender; however, due to the indistinct nature of this category, limited conclusions as to these differences can be drawn. Analyses of gender and reward suggest a significant difference in the amount of reward perceived when participating in behaviors classified as "Other" or "Employment/Volunteering" as a function of gender, with females reporting higher reward scores for each of these categories. These findings did not hold when gender was included in the multivariate analyses. Simultaneous regression analyses were completed for each of the behavioral domains, and for each behavioral domain's associated reward value. As reported in Tables 5 and 6, none of the regression models that examined time spent or perceived reward as predicted by gender, BMI, depression, anxiety, and locus of control were significant.

[2] Similar results were obtained when the "Eating alone" and "Eating with Others" categories were combined into a single "Eating" code in the univariate and multivariate analyses. In no case did BMI account for significant unique variance in time spent or reward value of this combined behavioral domain.

DISCUSSION

The current study was designed to assess a wide range of behaviors as they related to body mass index and perceived reward. The study utilized a daily diary measure in a novel manner in order to record and code various activities in which participants engaged throughout a one week interval. Univariate and multivariate analyses were conducted to determine to what extent body mass index was related to changes in the amount of time spent in various activities, and the amount of reward rated for each activity.

In the current study, no significant relationships were found between BMI and the duration and reward value of behaviors assessed via a daily diary monitoring procedure. These results were somewhat surprising, given previous research that supported behavioral differences as a function of weight. Although the relationship between BMI and activity type was not significant in the current study, it is worth noting that college students spent the majority of their time engaged in sedentary activities (29%), educational activities (21%), and eating behaviors (8%). Assuming that social behavior (12%) also represents relatively inactive behavioral processes, at least 70% of student behavior is non-physical in nature. Behaviors directly coded as "physical" represented 7% of monitored time, which translates to roughly 100 minutes of exercise daily. Compared to data from the American Time Use Survey conducted by the Bureau of Labor Statistics (2006), this amount is higher than national averages, which suggest that the average American spends between 15 and 20 minutes engaged in physical activity each day. As a collective group, therefore, it is interesting that this sample of college students seemed representative of national norms (38% were overweight or obese) and yet generally spent a larger proportion of time engaged in active behaviors.

Limitations

Failure to support study hypotheses may have in part been due to sample size limitations, particularly in the extreme groups (i.e., $n = 3$ in the underweight group and $n = 16$ in the obese group). The likelihood of detecting statistically significant differences across participants as a function of BMI was restricted due to these small cell sizes, which decreased the statistical power available in the current study. Lack of statistical power is a common and longstanding problem in psychological research (Abraham & Russell, 2008; Cohen, 1962; Rossi, 1990), but one that can be assuaged in several ways. In the current study, increasing sample size in extreme groups would have decreased standard error, increased power, and thereby decreased the likelihood of making a type 2 statistical error.

Lack of BMI and behavioral variability in the current sample may reflect the fact that the university students recruited for this study largely share a similar environment context, and thus are exposed to similar environmental cues regarding eating and/or activity level. This could explain the small percentage of underweight (3%) or obese (16%) individuals enrolled in the study relative to the majority of students falling within the normal to overweight range (81%). Additionally, variability in BMI within the sample could have been influenced by students' social networks. Recent studies suggest a social contagion model for obesity (Christakis & Fowler, 2007), which states that peer groups can act as vectors for changes in BMI. These students were selected from a pool of demographically homogenous undergraduates, as reflected by the fact that 83% of participants reported Caucasian ethnicity, the average age of participants was 19.7 years ($SD = 2.2$; Range = 18-36), the average level of education was 13.6 years ($SD = 1.1$; Range = 12-18), and all students were enrolled in an Introduction to Psychology course.

Given these similarities, it is likely that certain individuals within the sample were members of the same in-group or social network (Brewer, 1979; Tajfel & Turner, 1979), and thus could conceivably affect the BMI of their peers, thereby reducing variability within the sample.

Another factor that might have influenced results is related to measurement error. Although daily diary measures have been shown to have good psychometric properties, the manner in which activities were coded in the study may also have affected study findings. For example, the coding system utilized was an addition to the daily diary method that had not been previously assessed insofar as the reliability and validity of this approach. Additionally, the present study required the participants themselves to code the various types of activities in which they engaged. Although participants received some instruction on how activities might be coded, this instruction was admittedly minimal, and participants were largely left to determine the category under which their behavior might fall in the absence of extensive guidance or training. This lack of structured training likely resulted in substantial inter-rater differences insofar as coding strategies were concerned, which in turn likely decreased the power of the study.

Further limitations include the fact that variations in sedentary activity were not considered separate behavioral domains within the daily diary coding system. For example, though television watching and video game playing have been assessed in relation to BMI in previous studies, both would likely have been categorized by participants in the current study as "Sedentary." Thus, potential differences in the effects of various sedentary behaviors on BMI could not be examined using the current coding system.

Finally, the daily diary method could be improved by breaking each day into smaller time increments, as half-hour intervals could potentially include several different activities.

Additionally, an entire half hour of exercise is a long time for some individuals to continue to participate in a physical activity. Thus, in using this time interval, it is possible that some accuracy in assessing for the frequency and duration of physical activity behaviors was sacrificed in the current study.

Future Directions

In terms of future study directions, targeting a larger and more diverse sample in assessing for differences activity type, duration, and reward as a function of BMI would increase the power and generalizability of results. Further analyses of differences in BMI, activity, and reward as these factors relate to sample demographics is also warranted. Additionally, development of a valid and reliable coding system for daily activities as a component of the daily diary assessment strategy could prove useful and interesting toward assessing behavioral similarities and differences as a function of BMI and psychological variables. Relatedly, assessment of the comprehensiveness and utility of selected behavioral domains should be revisited to determine whether modifications to the assessment process are necessary to more fully capture the various realms of human behavior. Alternative methods for describing varying behavior domains in relation to BMI should be explored. For example, some studies utilize the Previous Day Physical Activity Recall (PDPAR; Anderson, Hagstromer, & Yngve, 2005) in order to both categorize a wide variety of behaviors, and to translate these behaviors into metabolic equivalent (MET) values. This would allow for further examination of the caloric expenditure associated with engaging in various activities, and for a closer look at the relationship between BMI and activity type, frequency, and duration.

In closing, these data illustrate considerable similarities with regard to how individuals

spend their time, regardless of body mass. Results are interesting in the context of other studies within the field of health psychology that suggest the manner in which individuals spend their time varies as a function of weight. As outlined, the study was limited by sample size characteristics. Additionally, participants were a fairly homogenous group that generally engaged in common activities in a shared environment. It may be that the cultural climate at this particular university is such that although individuals might participate in differing activities following their college experience, their behaviors during their tenure as university students are more similar than otherwise.

REFERENCES

Abraham, W. T., Russell, D. W. (2008). Statistical power analysis in psychological research. *Social and Personality Psychology Compass, 2,* 283-301.

American Time Use Survey Summary. Bureau of Labor Statistics. (2006). United States Department of Labor, Washington.

Andersen, R. E., Crespo, C. J., Bartlett, S. J., Cheskin, L. J., Pratt, M. (1998). Relationship of physical activity and television watching with body weight and level of fatness among children: Results from the third national health and nutrition examination survey. *JAMA: Journal of the American Medical Association, 279*, 938-942.

Anderson, C. B., Hagstromer, M., Yngve, A. (2005). Validation of the PDPAR as an adolescent diary: Effect of accelerometer cut points. *Medicine and Science in Sports and Exercise, 37,* 1224 – 1230.

Atlas, G. D., & Peterson, C. (1990). Explanatory style and gambling: How pessimists respond to losing wagers. *Behaviour Research and Therapy*, 28, 523-529.

Balch, P., & Ross, A. W. (1975). Predicting success in weight reduction as a function of locus of control: A unidimensional and multidimensional approach. *Journal of Consulting and Clinical Psychology, 43*, 119

Barlow, D. H. (2002). *Anxiety and its disorders: The nature and treatment of anxiety and panic*. (2nd ed.) New York, NY: Guilford Press.

Beck, A. T., & Steer, R. A. (1987). *Beck Depression Inventory: Manual*. San Antonio, TX: The Psychiatric Corporation.

Beck, A. T., & Steer, R. A. (1990). The Beck Anxiety Inventory: Manual. The Psychological Corporation.

Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8,* 77-100.

Beck, A. T., Epstein, N., Brown, G., & Steer, R. A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56,* 893-897.

Bekker, M. H. J., & Spoor, S. T. P. (2008). Emotional inhibition, health, gender, and eating disorders: The role of (over) sensitivity to others. In A. Vingerhoets, I. Nyklicek, J. Denollet (Eds.). *Emotion regulation: Conceptual and clinical issues* (pp. 170-183). New York, NY: Springer Science and Business Media.

Bish, C. L., Blanck, H. M., Serdula, M. K., Marcus, M., Kohl, H. W. 3rd, Khan, L. K. (2005). Diet and physical activity behaviors among Americans trying to lose weight: 2000 Behavioral Risk Factor Surveillance System. *Obesity Research, 13*, 596-607.

Bishop, K. L. (2003). Longitudinal predictors of weight fluctuation in men and women. *Dissertation abstracts international: Section B: The sciences and engineering, 64*.

Block, J. P., Scribner, R. A., & DeSalvo, K. B. (2004). Fast food, race/ethnicity, and income. *American Journal of Preventive Medicine, 27,* 211-217.

Brewer, M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-motivational analysis. *Psychological Bulletin, 86,* 307-324.

Brown, W. J., Miller, Y. D., Miller, R. (2003). Sitting time and work patterns as indicators of overweight and obesity in Australian adults. *International Journal of Obesity and Related Metabolic Disorders, 27*, 1340-1346.

Brown, W. J., Trost, S. G. (2003). Life Transitions and Changing Physical Activity Patterns in Young Women. *American Journal of Preventive Medicine, 25*, 140-143.

Bruch, H. (1973). *Eating disorders*. New York: Basic Books.

Burggraf, K. K. (2001). Eating disorder symptomatology and media, family, psychological, and maturational variables: A longitudinal study of young females. *Dissertation Abstracts International: Section B: The Sciences and Engineering. 61*(12-B), 6734.

Byrne, S. M., Zafra, C., & Fairburn, C. G. (2004). Psychological predictors of weight regain in obesity. *Behaviour Research and Therapy, 42,* 1341-1356.

Carlson, N. R. (2004). *Physiology of Behavior* (8th ed.). Boston: Pearson.

Carrel, A. L., Clark, R. R., Peterson, S. E., Nemeth, B. A., Sullivan, J., Allen, D. B. Improvement of fitness, body composition, and insulin sensitivity in overweight children in a school-based exercise program: a randomized, controlled study. *Archives of Pediatric Adolescent Medicine, 159*, 963-8.

Cast, G. C., Frenken, F. J. M., van Leest, L. A. T. M., Wendel-Vos, G. C. W., et al. (2007). Intra-national variation in trends in overweight and leisure time physical activities in the Netherlands since 1980: Stratification according to sex, age, and urbanization degree. *International Journal of Obesity, 31,* 515 – 520.

Chen, S. Y., Chen, S. M., Chang, W. H., Lai, C. H., Chen, M. C., Chou, C. H., Kuo, C. H. (2005). Effect of 2-month detraining on body composition and insulin sensitivity in young female dancers. *International Journal of Obesity (London).*

Christakis, N. A., & Fowler, J. H. (2007). The spread of obesity in a large social network over 32 years. *The New England Journal of Medicine, 357,* 370-379.

Cohen, J. (1962). The statistical power of abnormal social-psychological research: A review. *Journal of Abnormal and Social Psychology, 65,* 145-153.

Craeynest, M., Crombez, G., DeHouwer, J., Deforche, B., Tanghe, A., De Bourdeaudhuij, I. (2005). Explicit and implicit attitudes towards food and physical activity in childhood obesity. *Behaviour Research and Therapy, 43,* 1111-1120.

Davis, C., Durnin, J. V. G. A., Elliott, S. (1995). Social, psychological, and behavioral factors related to body size in adult men and women: A comparison of methods. *Annals of Behavioral Medicine, 17*, 25-31.

Dejong, W. (1980). The stigma of obesity: The consequences of naïve assumptions concerning the causes of physical deviance. *Journal of Health and Social Behavior, 21,* 75-87.

Elfhag, K., Rossner, S., Lindgren, T., Andersson, I., et al. (2004). Rorschach Personality Predictors of Weight Loss With Behavior Modification in Obesity Treatment. *Journal of Personality Assessment, 83,* 293-305.

Elmore, D. K., & De Castro, J. M. (1990). Self-rated moods and hunger in relation to spontaneous eating behavior in bulimics, recovered bulimics, and normals. *International Journal of Eating Disorders, 9,* 179-190.

Epstein, L. H., & Leddy, J. J. (2006). Food Reinforcement. *Appetite, 46,* 22 – 25.

Epstein, L. H., & Saelens, B. E. (2000). Behavioral economics of obesity: Food intake and energy expenditure. In W. K. Bickel, & R. E. Vuchinich (Eds.) *Reframing health*

behavior change with behavioral economics (pp. 293 – 311). Mahwah, NJ: Lawrence Erlbaum.

Faith, M. S., Flint, J., Fairburn, C. G., Goodwin, G. M., & Allison, D. B. (2001). Gender differences in the relationship between personality dimensions and relative body weight. *Obesity Research, 9,* 647−650.

Feldman, S. I., Downey, G., & Shaffer-Neitz, R. (1999). Pain, negative mood, and perceived support in chronic pain patients: A daily diary study of people with reflex sympathetic dystrophy syndrome. *Journal of Consulting and Clinical Psychology, 67,* 776-785.

Fiscella, K. (1999). Is lower income associated with greater biopsychosocial morbidity? Implications for physicians working with underserved patients. *Journal of Family Practice, 48,* 372-389.

Friedman, M. A., & Brownell, K. D. (1995). Psychological correlates of obesity: Moving to the next research generation. *Psychological Bulletin, 117,* 3-20.

Fydrich, T., Dowdall, D., & Chambless, D. L. (1992). Reliability and validity of the Beck Anxiety Inventory. *Journal of Anxiety Disorders, 6,* 55-61.

Garnett, S. P., Cowell, C. T., Baur, L. A., Shrewsbury, V. A., Chan, A., Crawford, D., Salmon, J., Campbell, K., Boulton, T. J. (2005). Increasing central adiposity: the Nepean longitudinal study of young people aged 7-8 to 12-13 y. *International Journal of Obesity and Related Metabolic Disorders.*

Garrow, J. S., & Webster, J. (1985). Quetelet's index (W/H2) as a measure of fatness. *International Journal of Obesity, 9,* 147 – 153.

Grana, A. S., Coolidge, F. L., & Merwin, M. M. (1989). Personality profiles of the morbidly obese. *Journal of Clinical Psychology, 45,* 762-765.

Grant, L. D., Long, B. C., & Willms, J. D. (2002). Women's adaptation to chronic back pain: Daily appraisals and coping strategies, personal characteristics and perceived spousal responses. *Journal of Health Psychology, 7,* 545-564.

Goldfield, G. S., & Epstein, L. H. (2002). Can fruits and vegetables and activities substitute for snack foods? *Health Psychology, 21,* 299 – 303.

Harris, M. B., Walters, L. C., & Waschull, S. (1991). Altering attitudes and knowledge about obesity. *Journal of Social Psychology, 131,* 881-884.

Haythornthwaite, J. A., Hegel, M. T., & Kerns, R. D. (1991). Development of a sleep diary for chronic pain patients. *Journal of Pain and Symptom Management, 6,* 65-72.

Hedley, A. A., Ogden, C. L., Johnson, C. L., Carroll, M. D., Curtin, L. R., & Flegal, K. M. (2004). Prevalence of Overweight and Obesity Among US Children, Adolescents, and Adults, 1999-2002. *JAMA: Journal of the American Medical Association, 291,* 2847-2850.

Holtkamp, K., Konrad, K., Muller, B., Heussen, N., Herpertz, S., Herpertz-Dahlman, B., Hebebrand, J. (2004). Overweight and obesity in children with Attention-Deficit/Hyperactivity Disorder. *International Journal of Obesity, 28*, 685-6.

Hopko, D. R., Armento, M. E. A., Cantu, M. S., Chambers, L. L., Lejuez, C. W. (2003). The use of daily diaries to assess the relations among mood state, overt behavior, and reward value of activities. *Behavior Research and Therapy, 41,* 1137-1148.

Huang, Terry T. K., Harris, Kari Jo, Lee, Rebecca E., Nazir, Niaman, Born, Wendi, Kaur,

Harsohena. (2003). Assessing Overweight, Obesity, Diet, and Physical Activity in College Students. *Journal of American College Health, 52*, 83-86.

Jago, R., Nicklas, T., Yang, S. J., Baranowski, T., Zakeri, I., Berenson, G. S. (2005). Physical activity and health enhancing dietary behaviors in young adults: Bogalusa Heart Study. *Preventive Medicine, 41*, 194-202.

Janssen, I., Katzmarzyk, P. T., Srinivasan, S. R., Chen, W., Malina, R. M., Bouchard, C., Berenson, G. S. (2005). Utility of Childhood BMI in the Prediction of Adulthood Disease: Comparison of National and International References. *Obesity Research, 13*, 1106-1115.

Kaplan, M. S., Huguet, N., Newsom, J. T., McFarland, B.H., & Lindsay, J. (2003). Prevalence and correlates of overweight and obesity among older adults: Findings from the Canadian National Population Health Survey. *Journals of Gerontology: Series A: Biological Sciences and Medical Sciences, 58A*, 1018-1030.

Karpowitz, D. H., & Zeis, F. R. (1975). Personality and behavior differences of obese and nonobese adolescents. *Journal of Consulting and Clinical Psychology, 43*, 886-891.

Katzmarzyk, P.T., Malina, R. M., Song, T. M. K., Bouchard, C. (1998). Television viewing, physical activity, and health-related fitness of youth in the Quebec Family Study. *Journal of Adolescent Health, 23*, 318-325.

Kautiainen, S., Koivusilta, L., Lintonen, T., Virtanen, S. M., Rimpela, A. (2005). Use of information and communication technology and prevalence of overweight and obesity among adolescents. *International Journal of Obesity and Related Metabolic*

Disorders, 29, 925-33.

Kouvonen, A., Kivimaki, M., Cox, S. J., Cox, T., Vahtera, J. (2005). Relationship between work stress and body mass index among 45,810 female and male employees. *Psychosomatic Medicine, 67*, 577-83.

Kloiber, S., Ising, M., Reppermund, S., Horstmann, S., et al. (2007). Overweight and obesity affect treatment response in major depression. *Biological Psychiatry, 62,* 321 – 326.

Laitinen, J., Elk, E., & Sovio, U. (2002). Stress-related eating and drinking behavior and BMI and predictors of this behavior. *Preventive Medicine: An International Journal Devoted to Practice and Theory, 34,* 29-39.

Lewinsohn, P. M. (1974). A behavioral approach to depression. In Friedman, R. J., & Katz, M. M. (Eds.) *The psychology of depression: Contemporary theory and research*. Oxford, England: John Wiley & Sons.

Macias, J.A., & Vaz Leal, F.J. (2002). Personality assessment in morbid obesity. *German Journal of Psychiatry, 5,* 90-94.

Magnusson, M. B., Hulthen, L., Kjellgren, K. I. (2005). Obesity, dietary pattern and physical activity among children in a suburb with a high proportion of immigrants. *Journal of Human Nutrition and Dietetics, 18*, 187-194.

Matos, M. I. R., Aranha, L. S., Faria, A. N., Ferreira, S. R. G., et al. (2002). Binge eating disorder, anxiety, depression and body image in grade III obesity patients. *Revista Brasileira de Psiquiatria, 24,* 165-169.

Mei, Z., Grummer-Strawn, L. M., Pietrobelli, A., Goulding, A., Goran, M.I., Dietz, W. H. (2002). Validity of body mass index compared with other body-composition screening

indexes for the assessment of body fatness in children and adolescents. *American Journal of Clinical Nutrition*, 7597–985.

Mokdad, A. H., Ford, E. S., Bowman, B. A., Dietz, W. H., Vinicor, F., Bales, V. S., Marks, J. S. (2003). Prevalence of obesity, diabetes, and obesity-related health risk factors, 2001. *JAMA: Journal of the American Medical Association, 289*, 76-79.

Morin, C. M., Landreville, P., Colecchi, C., McDonald, K., Stone, J., Ling, W. (1999). The Beck Anxiety Inventory: Psychometric properties with older adults. *Journal of Clinical Geropsychology, 5,* 19-29.

Neckowitz, P., & Morrison, T. L. (1991). Interactional coping strategies of normal-weight bulimic women in intimate and nonintimate stressful situations. *Psychological Reports, 69,* 1167-1175.

Nelson, W. A., & Clum, G. A. (2002). Assessment of panic frequency: Reliability and validity of a time-line follow-back method. *Journal of Psychopathology and Behavioral Assessment, 24,* 47-54.

Nezu, A. M., Ronan, G. F., Meadows, E. A., & McClure, K. S. (Eds.) (2000). Practitioner's guide to empirically based measures of depression. In AABT clinical assessment series. Dordrecht, Netherlands: Kluwer Academic Publishers.

Nussbaum, K. M. (2005). The influence of body mass index on the relationship between emotions and eating in young African American adolescents. *Dissertation Abstracts International: Section B: The Sciences and Engineering. 65(8-B),* 4298.

Okami, P. (2002). Dear Diary: A useful but imperfect method. In Wiederman, Michael W (Ed); Whitley, Bernard E Jr. (Ed). (2002). *Handbook for conducting research on human*

sexuality. (pp. 195-207). Mahwah, NJ, US: Lawrence Erlbaum Associates, Publishers.

Osman, A., Kopper, B. A., Barrios, F. X., Osman, J. R., & Wade, T. (1997). The Beck Anxiety Inventory: Reexamination of factor structure and psychometric properties. *Journal of Clinical Psychology, 53,* 7-14.

Parsons, T. J., Power, C., Manor, O. (2005) Physical activity, television viewing and body mass index: a cross-sectional analysis from childhood to adulthood in the 1958 British cohort. *International Journal of Obesity (London), 29*, 1212-21.

Paxton, S. J., Sculthorpe, A. (1999). Weight and health locus of control beliefs in an Australian community sample. *Psychology & Health, 14*, 417-431.

Pells, Jennifer J. (2006). The role of negative affect and emotional avoidance in the maintenance of binge eating disorder. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 66, 6289.

Provencher, V., Bégin, C., Gagnon-Girouard, M. P., Tremblay, A., et al. (2008). Personality traits in overweight and obese women: Associations with BMI and eating behaviors. *Eating Behaviors, 9,* 294-302.

Rennie, K. L., Livingstone, M. B., Wells, J. C., McGloin, A., Coward, W. A., Prentice, A. M., Jebb, S. A. (2005). Association of physical activity with body-composition indexes in children aged 6-8 y at varied risk of obesity. *American Journal of Clinical Nutrition, 82*, 13-20.

Riebe, D., Blissmer, B., Greene, G., Caldwell, M., Ruggiero, L., Stillwell, K. M., Nigg, C. R. (2005). Long-term maintenance of exercise and healthy eating behaviors in overweight adults. *Preventive Medicine: An International Journal Devoted to Practice*

and Theory, 40, 769-778.

Robbins, P. R., & Tanck, R. H. (1984). Sex differences in problems related to depression. *Sex Roles, 11*, 703-707.

Roehling, M. V., & Winters, D. (2000). Job security rights: The effects of specific policies and practices on the evaluation of employers. *Employee Responsibilities and Rights Journal, 12,* 25-38.

Rossi, J. S. (1990). Statistical power of psychological research: What have we gained in 20 years? *Journal of Consulting and Clinical Psychology, 58,* 646-656.

Saelens, B. E., & Epstein, L. H. (1996). The reinforcing value of food in obese and non-obese women. *Appetite, 27,* 41 – 50.

Shisslak, C. M; Pazda, S. L; Crago, M. (1990). Body weight and bulimia as discriminators of psychological characteristics among anorexic, bulimic, and obese women. *Journal of Abnormal Psychology, 99*, 380-384.

Skinner, J. D., Bounds, W., Carruth, B. R., Morris, M. & Ziegler, P. (2004). Predictors of children's body mass index: A longitudinal study of diet and growth in children aged 2-8 y. *International Journal of Obesity, 28,* 476-482.

Soukup, V. M., Beiler, M. E., & Terrell, F. (1990). Stress, coping style, and problem solving ability among eating-disordered inpatients. *Journal of Clinical Psychology, 46,* 592-599.

Steer, R. A., Willman, M., Kay, P. A., & Beck, A. T. (1994). Differentiating elderly medical and psychiatric outpatients with the Beck Anxiety Inventory. *Assessment, 1,* 345-351.

Steinberger, J., Jacobs, D. R., Raatz, S., Moran, A., Hong, C. P., Sinaiko, A. R. (2005).

Comparison of body fatness measurements by BMI and skinfolds vs dual energy X-ray absorptiometry and their relation to cardiovascular risk factors in adolescents. *International Journal of Obesity, 29,* 1346-1352.

Stevens, J., Suchindran, C., Ring, K., Baggett, C. D., Jobe, J. B., Story, M., Thompson, J., Going, S. B., Caballero, B. (2004). Physical Activity as a Predictor of Body Composition in American Indian Children. *Obesity Research, 12,* 1974-1980.

Straub, R. O. (2002). *Health Psychology*. University of Michigan: Worth Publishers.

Sullivan, S., Cloninger, C. R., Przybeck, T. R., & Klein, S. (2007). Personality characteristics in obesity and relationship with successful weight loss. *International Journal of Obesity (London), 31,* 669−674.

Suris, Joan-Carles; Parera, Nuria. (2005). Don't stop, don't stop: Physical activity and adolescence. *International Journal of Adolescent Medicine and Health, 17,* 67-80.

Tajfel, H. & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. Austin & S. Worchel (Eds.). *The Social Psychology of Intergroup Relations*. Monterey, California: Brooks/Cole, (33-47).

Taylor, W. C., Poston, W. S. C., Jones, L., Kraft, M. K. (2006). Environmental Justice: Obesity, Physical Activity, and Healthy Eating. *Journal of Physical Activity and Health, 3,* S30-S54.

Thompson, O. M., Ballew, C., Resnicow, K., Must, A., Bandini, L. G., Cyr, H., Dietz, W. H. (2004). Food purchased away from home as a predictor of change in BMI z-score among girls. *International Journal of Obesity, 28,* 282-289.

Treuth, M. S., Hou, N., Young, D. R., Maynard, L. M. (2005). Accelerometry-measured

activity or sedentary time and overweight in rural boys and girls. *Obesity Research, 13*, 1606-14.

Troop, N. A., Holbrey, A., Trowler, R., & Treasure, J. L. (1994). Ways of coping in women with eating disorders. *Journal of Nervous and Mental Disease, 182,* 535-540.

Trost, S. G., Sirard, J. R., Dowda, M., Pfeiffer, K. A., Pate, R. R. (2003). Physical activity in overweight and nonoverweight preschool children. *International Journal of Obesity and Related Metabolic Disorders, 27*, 834-839.

U.S. Department of Health and Human Services. (2000). *Healthy People 2010: Understanding and Improving Health*. 2nd ed. Washington, DC: U.S. Government Printing Office.

Vandewater, E. A., Shim, M., Caplovitz, A. G. (2004). Linking obesity and activity level with children's television and video game use. *Journal of Adolescence, 27*, 71-85.

Viner, R. M., & Cole, T. J. (2006). Who changes body mass between adolescence and adulthood? Factors predicting change in BMI between 16 and 30 years in the 1970 British Birth Cohort. *International Journal of Obesity, 30,* 1368 – 1374.

Viner, R. M., & Cole, T. J. (2005) Television viewing in early childhood predicts adult body mass index. *Journal of Pediatrics, 147*, 429-35.

Wadden, T. A., & Stunkard, A. J. (1985). Social and psychological consequences of obesity. *Annals of Internal Medicine, 103,* 1062−1067.

Wake, M., Hesketh, K., & Waters, E. (2003). Television, computer use and body mass index in Australian primary school children. *Journal of Pediatrics and Child Health, 39*, 130-134.

Wallston, B. S, Wallston, K. A, Kaplan, G. D., Maides, S. A. (1976). Development and validation of the Health Locus of Control (HLC) Scale. *Journal of Consulting and Clinical Psychology, 44*, 580-585.

Wardle, J., Steptoe, A., Olliver, G., & Lipsey, Z. (1999). Stress, dietary restraint and food intake. *Journal of Psychosomatic Research, 48,* 195-202.

Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin, 96,* 465-490.

Watson, H. E. (1999). Problem drinkers in acute care settings: Validation of an assessment instrument. *International Journal of Nursing Studies, 36,* 415-423.

Webb, W. W., Morey, L. C., Castelnuovo-Tedesco, P., & Scott Jr., H.W. (1990). Heterogeneity of personality traits in massive obesity and outcome prediction of bariatric surgery. *International Journal of Obesity, 14,* 13-20.

Wetherell, J. L., & Areán, P. A. (1997). Psychometric evaluation of the Beck Anxiety Inventory with older medical patients. *Psychological Assessment, 9,* 136-144.

Willner, P., Benton, D., Brown, E., Cheets, S., et al. (1998). "Depression" increases "craving" for sweet rewards in animal and human models of depression and craving. *Psychopharmacology, 136,* 272 – 283.

Womble, L. G., Williamson, D. A., Martin, C. K., Zucker, N. L., Thaw, J. M., Netemeyer, R., Lovejoy, J. C., & Greenway, F. L. (2001). Psychosocial variables associated with binge eating in obese males and females. *International Journal of Eating Disorders, 30,* 217-221.

Wyatt, H. R., Peters, J. C., Reed, G. W., Barry, M., Hill, J. O. (2005). A Colorado statewide

survey of walking and its relation to excessive weight. *Med Sci Sports Exerc., 37*, 724-30.

Yoshioka, M., Ayabe, M., Yahiro, T., Higuchi, H., Higaki, Y., St. Amand, J., Miyazaki, H., Yoshitake, Y., Shindo, M., Tanaka, H. (2005). Long period accelerometer monitoring shows the role of physical activity in overweight and obesity. *International Journal of Obesity, 29,* 502-508.

APPENDIX

Table 1
Descriptive Statistics: Time spent in Behavioral Domains as a Function of BMI

	BMI Category			
Behavioral Domain	Underweight (<18.5 kg/m²) (n =3)	Normal (18.5-24.9 kg/m²) (n =59)	Overweight (25.0-29.9 kg/m²) (n=21)	Obese (>30.0 kg/m²) (n=16)
Social	M = 10.50 SD = 7.86	M = 16.08 SD = 9.25	M = 14.33 SD = 8.15	M = 12.75 SD = 8.86
Physical	M = 4.84 SD = .86	M = 8.27 SD = 7.51	M = 10.03 SD = 8.61	M = 6.00 SD = 6.29
Health/Hygiene	M = 3.50 SD = 1.33	M = 4.91 SD = 2.84	M = 4.93 SD = 2.13	M = 3.04 SD = 1.08
Spiritual	M = 3.00 SD = 3.97	M = 1.46 SD = 3.97	M = 1.10 SD = 1.89	M = 0.25 SD = 0.94
Educational	M = 26.17 SD = 5.62	M = 26.78 SD = 10.57	M = 23.50 SD = 9.94	M = 24.75 SD = 14.07
Sedentary	M = 37.84 SD = 16.75	M = 33.53 SD = 14.38	M = 35.53 SD = 8.66	M = 36.54 SD = 12.71
Sexual	M = 0.00 SD = 0.00	M = 0.59 SD = 1.46	M = 1.60 SD = 2.47	M = 1.04 SD = 1.73
Employment/ Volunteering	M = 6.17 SD = 7.15	M = 6.59 SD = 7.15	M = 4.93 SD = 8.11	M = 12.32 SD = 16.97
Hobbies/ Recreation	M = 2.50 SD = 4.33	M = 3.96 SD = 6.77	M = 4.93 SD = 6.10	M = 3.79 SD = 5.18
Eating Alone	M = 3.34 SD = 2.31	M = 2.27 SD = 1.92	M = 2.60 SD = 2.75	M = 3.43 SD = 3.79
Eating with Others	M = 5.67 SD = 1.16	M = 6.60 SD = 3.80	M = 7.73 SD = 3.41	M = 6.57 SD = 3.35
Travel	M = 8.50 SD = 3.97	M = 6.71 SD = 6.28	M = 7.10 SD = 5.19	M = 5.19 SD = 4.54
Other	M = 10.34 SD = 12.29	M = 3.29 SD = 5.20	M = 2.98 SD = 3.57	M = 2.79 SD = 5.37

Table 2
Bivariate Correlations
BDI, BAI, and MHLC Averaged Pre- and Post-Recording Week

		Gender	BMI	BDI-II	BAI	MHLC
Gender:	Pearson Correlation	1	-0.25*	0.05	0.15	-0.07
	Sig. (2-tailed)		0.01	0.63	0.15	0.50
	N	99	99	95	92	97
BMI:	Pearson Correlation	-0.25*	1	0.19	0.08	-0.30
	Sig. (2-tailed)	0.01		0.07	0.43	0.77
	N	99	99	95	92	97
BDI-II:	Pearson Correlation	0.05	0.19	1	0.74**	-0.34
	Sig. (2-tailed)	0.63	0.07		0.00	0.74
	N	95	95	95	90	95
BAI:	Pearson Correlation	0.15	0.08	0.74**	1	-0.04
	Sig. (2-tailed)	0.15	0.43	0.00		0.70
	N	92	92	90	92	92
MHLC:	Pearson Correlation	-0.07	-0.30	-0.34	-0.04	1
	Sig. (2-tailed)	0.50	0.77	0.74	0.70	
	N	97	97	95	92	97

*. Correlation is significant at the 0.05 level (2-tailed)
**. Correlation is significant at the 0.01 level (2-tailed)

Table 3
ANCOVA Values and Effect Sizes of Time Spent in Behavioral Domains as a Function of BMI: Results with gender included in the analyses in italics

Behavioral Domain	F	Sig.	Partial η^2
Social	0.93 *0.85*	0.48 *0.59*	0.07 *0.11*
Physical	1.18 *1.02*	0.33 *0.44*	0.08 *0.12*
Health/Hygiene	2.25 *0.64*	0.05 *0.00*	0.15 *0.44*
Spiritual	0.80 *0.64*	0.58 *0.78*	0.06 *0.08*
Educational	0.94 *1.13*	0.47 *0.35*	0.07 *0.13*
Sedentary	0.55 *0.65*	0.77 *0.77*	0.04 *0.08*
Sexual	1.15 *0.71*	0.34 *0.72*	0.08 *0.09*
Employment/ Volunteering	1.55 *1.38*	0.17 *0.21*	0.11 *0.16*
Hobbies/ Recreation	0.63 *0.53*	0.71 *0.86*	0.05 *0.07*
Eating Alone	0.51 *1.01*	0.80 *0.44*	0.04 *0.12*
Eating with Others	0.70 *1.58*	0.65 *0.13*	0.05 *0.18*
Travel	0.38 *0.95*	0.90 *0.49*	0.03 *0.12*
Other	1.11 *2.19*	0.37 *0.03**	0.08 *0.23*

Table 4
ANCOVA Values and Effect Sizes of Reward Value in Behavioral Domains as a Function of BMI: Results with gender included in the analyses in italics

Behavioral Domain	F	Sig.	Partial η^2
Social	0.39 *0.57*	0.88 *0.83*	0.03 *0.08*
Physical	0.53 *0.58*	0.78 *0.82*	0.05 *0.09*
Health/Hygiene	0.60 *0.46*	0.73 *0.91*	0.05 *0.06*
Spiritual	2.24 *1.75*	0.08 *0.15*	0.38 *0.41*
Educational	0.20 *0.78*	0.98 *0.65*	0.02 *0.10*
Sedentary	1.17 *1.50*	0.33 *0.16*	0.09 *0.18*
Sexual	0.46 *0.91*	0.80 *0.53*	0.10 *0.30*
Employment/ Volunteering	0.67 *2.37*	0.68 *0.03**	0.10 *0.39*
Hobbies/ Recreation	0.36 *0.33*	0.90 *0.96*	0.05 *0.07*
Eating Alone	0.61 *1.11*	0.73 *0.37*	0.05 *0.15*
Eating with Others	0.68 *1.72*	0.67 *0.09*	0.05 *0.20*
Travel	1.22 *1.29*	0.31 *0.26*	0.10 *0.18*
Other	1.04 *2.11*	0.41 *0.04**	0.11 *0.31*

Table 5
Regression Analyses of Time Spent in Behavioral Domains: Results with gender included in the analyses in italics

Behavioral Domain	BMI B	BDI-II β	BAI β	MHLC β	Gender β	F	Sig.	R^2
Social	-0.13 *-0.12*	-0.25 *-0.24*	0.17 *0.17*	0.09 *0.09*	- *0.02*	1.16 *0.92*	0.34 *0.47*	0.06 *0.06*
Physical	-0.06 *-0.09*	-0.29 *-0.30*	0.28 *0.31*	-0.03 *-0.04*	- *-0.12*	0.94 *0.97*	0.45 *0.44*	0.05 *0.06*
Health/Hygiene	-0.20 *-0.08*	-0.20 *-0.15*	0.35 *0.22*	-0.08 *-0.04*	- *0.52*	2.27 *8.15*	0.07 *0.00*	0.10 *0.34*
Spiritual	-0.07 *-0.06*	-0.05 *-0.04*	0.00 *-0.01*	0.18 *0.19*	- *0.07*	0.87 *0.76*	0.49 *0.58*	0.04 *0.05*
Educational	-0.15 *-0.11*	-0.04 *-0.02*	-0.17 *-0.21*	0.04 *0.05*	- *0.15*	1.51 *1.56*	0.21 *0.18*	0.07 *0.09*
Sedentary	0.13 *0.10*	0.10 *0.09*	-0.08 *-0.05*	-0.13 *-0.14*	- *-0.13*	0.82 *0.91*	0.52 *0.48*	0.04 *0.06*
Sexual	0.12 *0.12*	0.06 *0.06*	0.05 *0.05*	-0.12 *-0.12*	- *0.02*	0.91 *0.72*	0.46 *0.61*	0.04 *0.04*
Employment/ Volunteering	0.23 *0.19*	0.17 *0.15*	0.06 *0.10*	0.07 *0.06*	- *-0.18*	2.50 *2.58*	0.06 *0.03*	0.11 *0.14*
Hobbies/ Recreation	0.01 *-0.01*	0.32 *0.31*	-0.23 *-0.22*	-0.01 *-0.02*	- *-0.06*	0.88 *0.75*	0.48 *0.59*	0.04 *0.05*
Eating Alone	0.08 *0.02*	0.11 *0.08*	-0.08 *-0.02*	-0.05 *-0.07*	- *-0.27*	0.32 *1.35*	0.87 *0.25*	0.02 *0.08*
Eating with Others	0.04 *0.11*	-0.09 *-0.06*	0.15 *0.07*	-0.11 *-0.08*	- *0.32*	0.50 *2.09*	0.74 *0.08*	0.03 *0.12*
Travel	-0.11 *-0.10*	-0.01 *-0.01*	0.02 *0.02*	0.12 *0.12*	- *0.02*	0.55 *0.44*	0.70 *0.82*	0.03 *0.03*
Other	-0.11 *-0.02*	-0.09 *-0.05*	-0.04 *-0.14*	0.02 *0.06*	- *0.38*	0.66 *3.08*	0.62 *0.01*	0.03 *0.41*

Table 6
Regression Analyses of Reward Value in Behavioral Domains: Results with gender included in the analyses in italics

Behavioral Domain	BMI B	**BDI-II** **β**	**BAI** **β**	**MHLC** **β**	**Gender** **β**	F	Sig.	R^2
Social	0.07 *0.11*	0.02 *0.04*	0.00 *-0.04*	-0.02 *-0.01*	- *0.18*	0.11 *0.12*	0.98 *0.74*	0.01 *0.04*
Physical	-0.13 *-0.17*	-0.00 *-0.01*	-0.06 *-0.03*	-0.12 *-0.13*	- *-0.12*	0.60 *0.64*	0.67 *0.67*	0.03 *0.05*
Health/Hygiene	-0.08 *-0.10*	-0.16 *-0.16*	0.05 *0.07*	-0.11 *-0.12*	- *-0.07*	0.73 *0.66*	0.57 *0.66*	0.04 *0.04*
Spiritual	0.18 *0.21*	-0.73 *-0.59*	0.71 *0.55*	0.42 *0.41*	- *0.23*	1.85 *1.79*	0.15 *0.15*	0.24 *0.28*
Educational	0.05 *0.11*	-0.12 *-0.10*	0.10 *0.03*	0.08 *0.10*	- *0.26*	0.28 *1.26*	0.89 *0.29*	0.01 *0.08*
Sedentary	-0.12 *-0.07*	-0.19 *-0.18*	0.09 *0.05*	0.13 *0.16*	- *0.21*	1.15 *1.54*	0.34 *0.19*	0.06 *0.10*
Sexual	-0.25 *-0.25*	-0.11 *-0.11*	-0.02 *-0.01*	0.13 *0.13*	- *-0.02*	0.73 *0.55*	0.59 *0.73*	0.12 *0.12*
Employment/ Volunteering	-0.18 *-0.09*	0.09 *0.08*	-0.04 *-0.09*	-0.06 *0.01*	- *0.44*	0.35 *2.07*	0.84 *0.09*	0.04 *0.46*
Hobbies/ Recreation	-0.16 *-0.15*	-0.11 *-0.11*	0.20 *0.19*	0.10 *0.10*	- *0.06*	0.55 *0.47*	0.70 *0.80*	0.05 *0.05*
Eating Alone	0.14 *0.15*	-0.15 *-0.15*	-0.02 *-0.03*	0.03 *0.03*	- *0.00*	0.78 *0.62*	0.54 *0.67*	0.04 *0.04*
Eating with Others	-0.07 *-0.02*	-0.11 *-0.10*	0.04 *-0.01*	0.08 *0.10*	- *0.21*	0.42 *1.01*	0.79 *0.42*	0.02 *0.06*
Travel	-0.08 *0.00*	-0.31 *-0.30*	0.24 *0.16*	0.19 *0.20*	- *0.30*	1.40 *2.42*	0.24 *0.05*	0.08 *0.16*
Other	0.19 *0.25*	-0.11 *-0.03*	-0.05 *-0.18*	0.29 *-0.18*	- *0.38*	1.88 *3.55*	0.13 *0.01*	0.13 *0.26*

DAILY DIARY (SAMPLE)

M T W TH F SA SU	Activity/Behavior	Activity/Behavior Code	How pleasurable? (1-4)
8:00 – 8:30 A.M.			
8:30 – 9:00 A.M.			
9:00 – 9:30 A.M.			
9:30 – 10:00 A.M.			
10:00 – 10:30 A.M.			
10:30 – 11:00 A.M.			
11:00 – 11:30 A.M.			
11:30 – 12:00 P.M.			
12:00 – 12:30 P.M.			
12:30 – 1:00 P.M.			
1:00 – 1:30 P.M.			
1:30 – 2:00 P.M.			
2:00 – 2:30 P.M.			
2:30 – 3:00 P.M.			
3:00 – 3:30 P.M.			
3:30 – 4:00 P.M.			
4:00 – 4:30 P.M.			
4:30 – 5:00 P.M.			
5:00 – 5:30 P.M.			
5:30 – 6:00 P.M.			
6:00 – 6:30 P.M.			
6:30 – 7:00 P.M.			
7:00 – 7:30 P.M.			
7:30 – 8:00 P.M.			
8:00 – 8:30 P.M.			
8:30 – 9:00 P.M.			
9:00 – 9:30 P.M.			
9:30 – 10:00 P.M.			
10:00 – 10:30 P.M.			
10:30 – 11:00 P.M.			
11:00 – 11:30 P.M.			
11:30 – 12:00 A.M.			
12:00 – 12:30 A.M.			

12:30 – 1:00 A.M.			
1:00 – 1:30 A.M.			

DEMOGRAPHIC INFORMATION (SAMPLE)

Please provide the following information by circling or writing in your answer:

Phone Number: _____ E-mail address: _____

1. Gender
    a) Male
    b) Female

2. Age: _____

3. Ethnicity
    a) Caucasian
    b) African American
    c) Latino
    d) Asian or Pacific Islander
    e) American Indian or Alaskan Native
    f) Other

4. Marital Status
    a) Single
    b) Married
    c) Separated
    d) Divorced

5. Family Income (each year)
    a) $0-$9,999
    b) $10,000-$19,999
    c) $20,000-$29,999
    d) $30,000-$39,999
    e) $40,000-$49,999
    f) Greater than $50,000

6. Occupational Status
    a) Employed full-time
    b) Employed part-time
    c) Unemployed

7. Education (years): _____
    (example: Grade 12 + 1 year in college = 13 years; Grade 12 + 2 years in college = 14 years, etc.)

Examiner Use Only

Height (in feet): _____ Weight (in pounds): _____ BMI: _____

VITA

Christen graduated from Vanderbilt University in 2005 with her B.A. in Anthropology and Psychology. She has broad research interests that include studying the relations of body image, health, and psychopathology (i.e., eating disorders, depression and anxiety), and psychotherapy outcomes. She is currently working with Dr. Hopko on his grant-funded study that examines the behavioral treatment of depression in cancer patients, in addition to fulfilling her responsibilities as a psychology resident at the University of Tennessee Medical Center Emergency Room, and as a Psychology Associate at Cherokee Health Systems.